

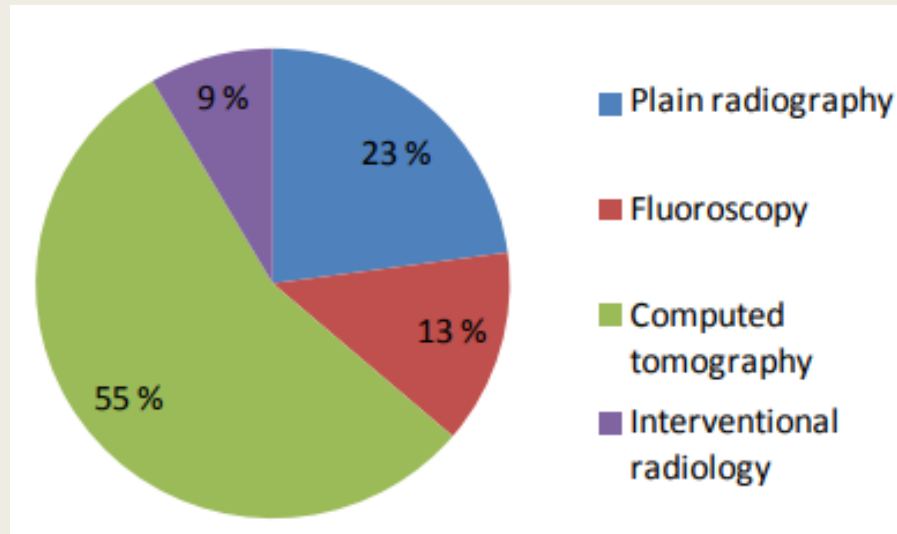
# DIAGNOSTIC REFERENCE LEVELS AND PATIENT DOSES FOR ADULT PATIENTS IN CONVENTIONAL X-RAY EXAMINATIONS IN LATVIA

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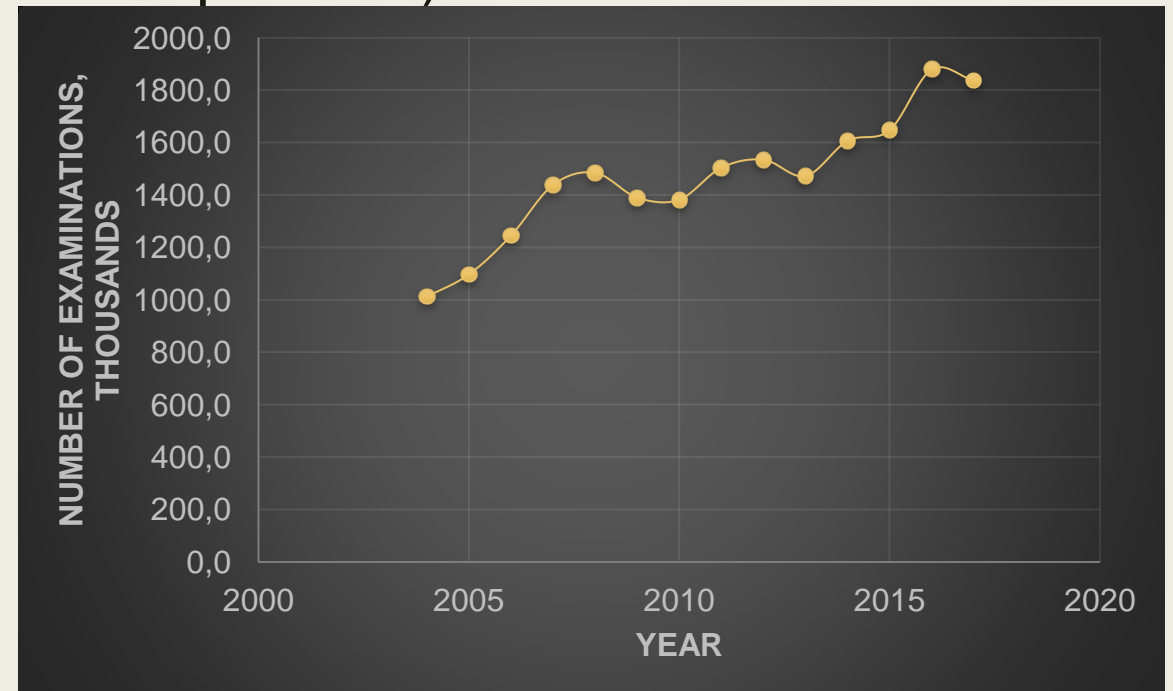
# Problem (1)

Relative contributions of the four main radiological examinations to the overall collective effective dose (Europe)\*



\*European Commission, 2014. *Radiation Protection No.180: Medical Radiation Exposure of the European Population, Part 1/2*, Luxembourg: Directorate-General for Energy and Transport Directorate D — Nuclear Safety&Fuel Cycle Unit D3 — Radiation Protection .

Number of conventional x-ray examinations in Latvia (for outpatients)\*\*



\*\*The centre for Disease Prevention on Control of Latvia

# Problem (2)

- Diagnostic reference levels – one of the tools for optimization
- Current DRLs in Latvia
  - *Published in Cabinet regulations*
  - *expressed as entrance surface dose*
  - *the values are coming from the most common DRL values from European study about DRLs in thirty-six European countries\**

*\*European Commission, 2014. Radiation Protection No.180: Medical Radiation Exposure of the European Population, Part 1/2, Luxembourg: Directorate-General for Energy and Transport Directorate D — Nuclear Safety&Fuel Cycle Unit D3 — Radiation Protection.*

# Purpose of the work

- Radiation Safety Centre of State Environmental Service of Latvia (regulatory body in the field of radiation safety) recognized the need of national DRLs
- National survey was performed in 2018-2019 to collect data to establish national DRLs in conventional x-ray examinations for adults for the first time in Latvia

# Materials and methods

- Dose collection sheets were sent to all hospitals in Latvia
  - *For the most common conventional x-ray examinations*
  - *Doses as DAP values*
- DRLs were calculated as third quartile of hospitals' median values
- Effective dose was calculated using conversion factors\*
  - *Effective dose= (conversion factor) x (mean DAP value)*

\*Wall, B. F. et al., 2011. Radiation Risks from Medical X-ray Examinations as a Function of the Age and Sex of the Patient, Oxfordshire: Health Protection Agency.

Amount of data received from medical institutions		
	X-ray machines for whom data for at least 10 patients were received	Total amount of patient data received
Lumbar spine AP	27	555
Lumbar spine LL	27	507
Pelvis AP	16	305
Hip AP	20	396
Chest PA	47	914
Chest LL	27	539
Thoracic spine AP	17	379
Thoracic spine LL	17	373
Sinuses	20	404

# Results (1):

Median DAP values for adults among all medical institutions

Median DAP values ( $\mu\text{Gym}^2$ )					
	Min	Max	Max/min	1 <sup>st</sup> Quartile	3 <sup>rd</sup> Quartile
Lumbar spine AP	25	580	24	90	169
Lumbar spine LL	82	1139	14	114	282
Pelvis AP	63	330	5	73	176
Hip AP	25	176	7	37	71
Chest PA	3	52	15	6	13
Chest LL	10	143	14	16	143
Thoracic spine AP	18	221	12	30	69
Thoracic spine LL	24	255	11	43	103
Sinuses	9	118	14	19	48

# Results (2):

Effective dose from different x-ray examinations in Latvia

	Mean effective dose (mSv)
Lumbar spine AP	0.346
Lumbar spine LL	0.219
Pelvis AP	0.199
Hip AP	0.098
Chest PA	0.018
Chest LL	0.045
Thoracic spine AP	0.174
Thoracic spine LL	0.088

# Results (3):

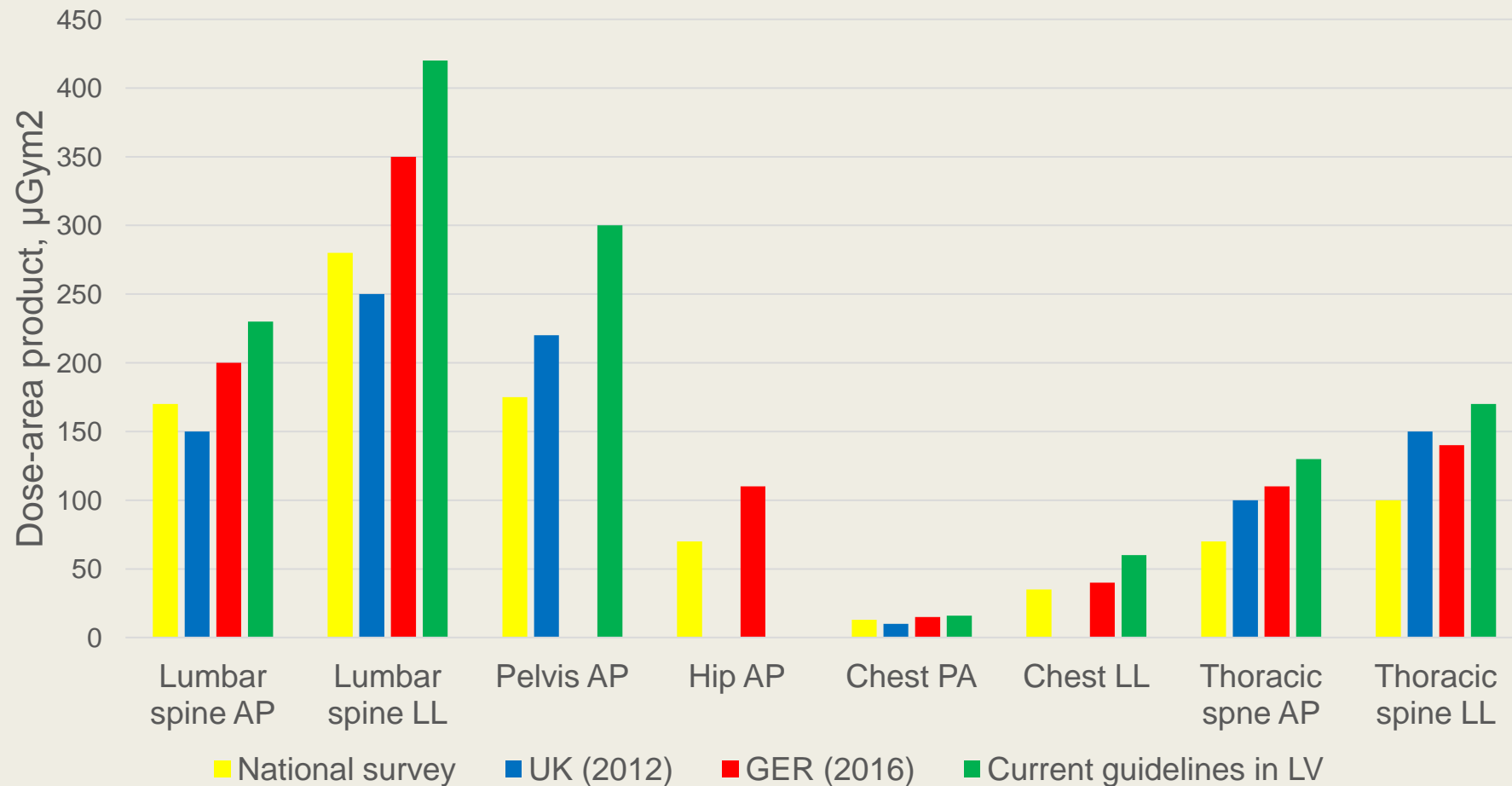
Established DRLs from national survey

Examination		Established DRLs ( $\mu\text{Gym}^2$ )
Lumbar spine	AP	170
	LL	280
Pelvis	AP	175
Hip	AP	70
Chest	AP	13
	LL	35
Thoracic spine	AP	70
	LL	100



# Results (4):

DRLs from national survey in comparison with UK, Germany and current guidelines in Latvia



# Conclusions

1. DRLs from this survey will be proposed as national DRLs to be put in regulations (currently they have been published as guidelines)
2. Evaluation of clinical protocols used and clinical practice performed was suggested for medical institutions with biggest median DAP values